Internal migration as an adaptation to climate change exposures: Experiences of urban informal settlements in Dhaka city, Bangladesh

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Introduction

There is a pressing need to study about climate change, internal migration and adaptation process due to the increased impact of extreme weather events. Many people of developing countries who live in climate change prone areas consider internal migration as an immediate and effective strategy for adapting to climate change. Plenty of literature revealed that current context of climate vulnerability forces many people to migrate from their original places to other places for livelihood collection, as traditional means of livelihood cannot support them to face the threats of natural disaster. On the other hand, the city and urban area is considered as a place of employment opportunities, home of shelter less people, civic facilities and supply chain of food and services. For that reason, peoples from climate change prone areas move in cities after natural disaster happening every year. These natural disasters are very likely to affect people with loss employment opportunity, loss habitat, reducing agricultural land productivity and destroying agricultural production. These losses make people poor and homeless that push them to move to cities with their entire household members. Consequently, city has become a place of destination for many destitute people. There are informal settlements (slum areas) in cities where low-income people come to live here after being affected by extreme weather events. As these areas are easily manageable, house rent is minimal and located in the heart of city, climate induced people choose these areas as their primary residence. However, there is a concern about how and to what extent slum dweller coming from climate change prone areas can manage their livelihoods as part of their adaptation process. In connection with this inquiry, this study is devoted to finding answer to this research query through systematic investigation. Therefore, this study considers sustainable livelihood framework and social capital as its theoretical grounds pursuing nexus of climate induced migration and adaptation process. Methodologically the study is based on mixed method research approach following the idea of pragmatic research philosophy.

Theoretical implications

Sustainable livelihood framework initiated by concentrated efforts of global development agencies emphasize on five different types of capital that could be ensured to promote a community, society, or a state to give sustainability of living standard. This sustainable approach encompasses distinctively human capital, physical capital, financial capital, social capital and natural capital. in developing human resources especially enriching intangible assets of human being mostly depends upon their scope of educational facilities, training and workshop preparing a community for job market that ultimately refers to human capital. surrounding living environment is consist of physical factors that refers critical tangible amenities such as communication facilities like road and communication system, water and

disposal system along with drainage and sewerage facilities including waste management. In terms of livelihood collection, financial provisions are very important factors for resilience that incorporate easy access of under privileged group of people to credit market for issuing loan and savings which can enhance employment opportunities and income generating activities along with coping the crisis situations. On the other hand, interpersonal relationship, interactions, bonding, bridging and networking among the community members and other institutions both formal and informal communication promote social capital that is important for sustainable livelihood provisions. Furthermore, natural factors such as creating green space in the form of tree plantation, gardening, and horticultural activities surrounding the living areas can ensure environmental amenities that contribute to make the community liveable and sustainable. Therefore, this study justifies the adaptation process of the climate induced migration under the umbrella of sustainable livelihood framework.

Research methods

This study first formulates and defines research problems such as movement of people due to facing climate vulnerabilities and concentrated in slums coming to the cities. This movement simultaneously affects the place of origin and destination in terms of labour supply, stressing urban informal settlements and issues of adaptability. The research problem raises the research question: how do climate migrants ensure their adaptation to new urban settlements through strategic action like rural-urban migration due to facing the effects of extreme weather events? To uncover the research investigation, mixed method research methodology has been used based on the pragmatic research philosophy and triangulation data collection method. Therefore, household survey, focus group discussion, and key informant interviews were used for quantitative explanation and qualitative exploration. Descriptive and inferential statistical tools were used to analyse numerical data though univariate, bivariate and multivariate techniques; while coding, sub-coding, and key concepts are tabulated to formulate thematic analysis of textual data collected though qualitative techniques. All findings are described and interpreted in result chapters with maintaining the sequence of research objectives.

Results and discussion

Findings of the study are expressed in terms of climate vulnerability assessment that the slum dwellers faced in their home districts for which they moved in Dhaka city as climate migrants. Later the study investigated respondents' socio-economic and livelihood reconstruction status and their evaluation about the facilities which are available in this urban setting. Figure-a shows triangulation diagram comprising with adaptive capacity, exposure and sensitivity in which exposure is measured with highest value as .521 comparing the other two indicators e.g. adaptive capacity and sensitivity. On the other hand, extreme weather events like flood, drought, storm surges and cyclone were the main causes of great losses for the climate migrants. These losses include agricultural land degradation, land productivity reduction, affecting the income generating activities and loss of homestead (Figure-b) that

terribly pushed people to be displaced. Because of that, all climate migrants (100%) came and live in slums for grabbing employment opportunity in Dhaka city. In purpose of justifying validity of this findings, Kendall's tau_b (non-parametric) correlation is measured which shows that coefficient of 'migration causes' with 'impacts of climate change exposures', and 'loss and damage' are .790 and .691 respectively at the 5 % level of significance. On the other hand, correlation between 'impacts of climate change exposures' and 'causes of loss and damage' is .598; while correlation between 'causes and consequences of environmental disaster' is .537 at the 5% level of significance (Table-1). Therefore, it means that climate migrants living slum areas of Dhaka city have been exploited by climate exposures and because of these causes they moved here for seeking adaptation to climate change,

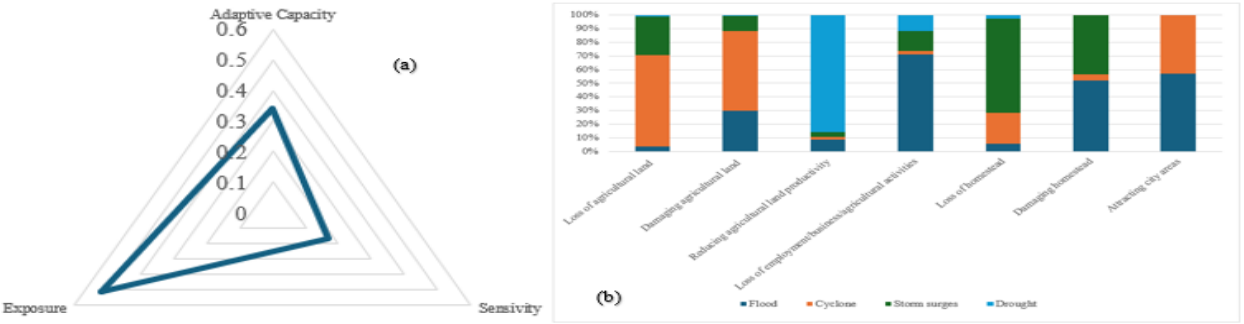


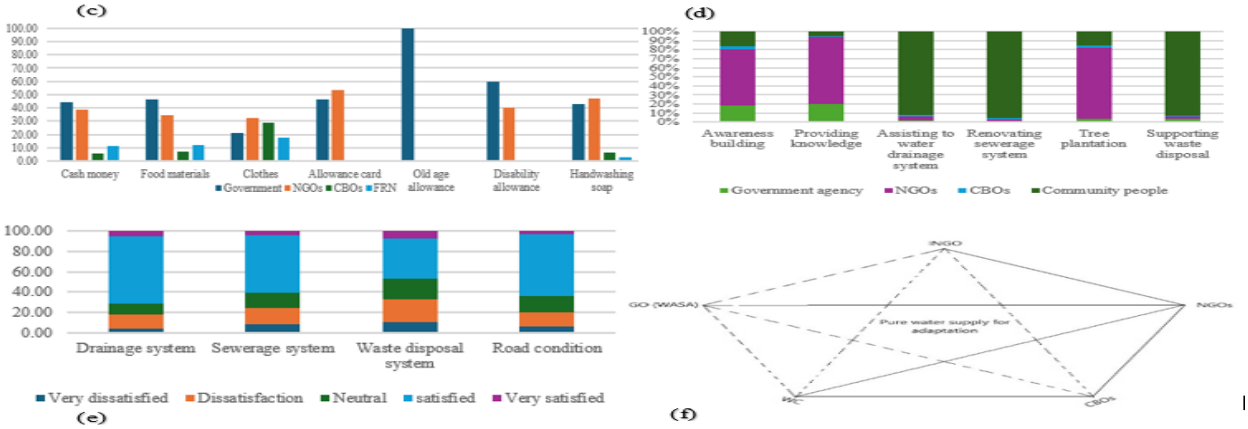
Table 1: Correlation coefficient values among the items of climate change exposures, loss and damage, causes and consequences of environmental disaster

Items		Causes of migration	Impacts of climate change exposures	Causes of loss and damages	Causes of environmental disaster	Consequences of environmental disaster
Causes of migration	Coefficient	1.000	.790**	.691**	.110**	0.052
Impacts of climate change exposures	Coefficient	.790**	1.000	.598**	.130**	.071*
Causes of loss and damages	Coefficient	.691**	.598**	1.000	0.057	0.012
Causes of environmental disaster	Coefficient	.110**	.130**	0.057	1.000	.537**
Consequences of environmental disaster	Coefficient	0.052	.071*	0.012	.537**	1.000

No. of Observations 400
** P < 0.01, *P < 0.05
Source: Household Survey, 2023

As the study was pursued in two slums of Dhaka city, one is Bhashantek slum, and another is Korail slum. Both are regarded as the major concentration of climate migrants who have come here from various climate change prone areas of Bangladesh. Therefore, government and nongovernment organizations are keen to help in many ways to these slum dwellers. During household survey, it is reported that slum dwellers received aid from various sources like councils, NGOs, community organizations, and friends, family and neighbours in terms of monetary and non-monetary allowance (Figure c). There is a significant threat to physical environment of slums and the slum dwellers are aware to keep their environment healthy with the help of external stakeholders like government agency, NGOs and CBOs (community-based Organizations). The figure d show that there are plenty of activities are going on to keep the physical environment of slums sound and healthy by multi-stakeholders' initiations. It found contribution of NGOs which is more significant in awareness building, knowledge sharing and tree plantation; community people's contribution is remarkable in renovating drainage system, sewerage system and waste disposal system. On the other hand, respondents' opinions have been justified through Likert Scale and it is found that satisfied portion is significantly notable in drainage, sewerage, waste disposal system and existing

road conditions (Figure e). Pure water supply is a critical issue in every slum area of Dhaka city, as lacking water supply could increase various types of disease like diarrhoea, dehydration or any kind of non-communicable disease. However, it is observed that there is a direct and indirect collaboration among donor agencies, GO, NGOs, CBOs and community people to keep water supply available for everybody living in studied slum areas (Figure f).



There are some new initiatives related to financial services for slum dwellers that have been found in both slums. Thes services include loan withdrawal and savings facilities promoted by NGOs, community-based organizations, money lender and commercial bank. However, NGOs' contribution is very significant than any other parties involved in providing financial services. In the discussion of health and sanitation that are another important service in slum dwellers provided by governmental hospital, private hospital, NGOs health centre and community health centre. Household survey provides that significant portion of respondents are satisfied on provided health services. However, other types of evaluation like dissatisfaction and neutral are not negligible compared to the satisfaction level of assessment. Therefore, it is a little bit questionable that whether slum dwellers living in Bhashantek and Korail slum are truly good with this medical treatment at all.

Conclusion

To recapitulate, slum dwellers living in study areas especially those are migrated due to extreme weather events are trying to adapt with new urban setting in terms of creating bonding, bridging, and networking. Their activities could be evaluated from micro to macro views that are related with the stereotype of social capital incorporating all types of relationships, interactions and communications. Although these collaborative activities in getting adaptability are notably praiseworthy, there are challenges that slum dwellers confront every moment of working. These challenges could come both from stakeholders' own side and from wide range of societal context that are unavoidable in most cases. However, it is praiseworthy and optimistic that every stakeholder from their own position is aware to ensure adaptation to climate change by solving the challenges created both in micro and macro level contexts.